D9

Patent Abstracts of Japan

PUBLICATION NUMBER : 2003168553
PUBLICATION DATE : 13-06-03

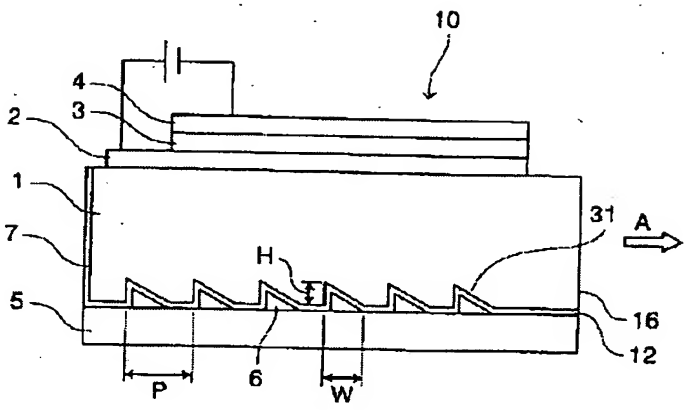
APPLICATION DATE : 30-11-01
APPLICATION NUMBER : 2001366854

APPLICANT : SHARP CORP;

INVENTOR : KAWASE NORITAKA;

INT.CL. : H05B 33/00 B41J 2/44 B41J 2/45
B41J 2/455 H05B 33/02 H05B 33/14

TITLE : ORGANIC LED ELEMENT



ABSTRACT : PROBLEM TO BE SOLVED: To provide an organic LED element in which the emission of the organic luminous layer can be taken out with high efficiency.

SOLUTION: The organic LED element comprises a light-emitting part including at least an organic luminous layer and an incidence face and an outgoing radiation face of the light of the organic luminous layer, and the light-emitting part comprises a light-guide part arranged in contact with the incidence face and a reflecting part that reflects the light of the organic luminous layer entered in the light-guide part and radiates from the outgoing radiation face. The reflecting part comprises a cross section of saw-tooth form in which triangles are connected continuously in the outgoing direction of the light and is made of a concavo-convex part in which the one oblique line of each triangle is arranged so as to form a oblique face facing the outgoing radiation face.

(19)日本国特許庁（ＪＰ）　(12)公開特許公報（Ａ）　(11)特許出願公開番号
特開2003－168553
（P2003－168553A）
(43)公開日　平成15年６月13日(2003.6.13)

(51)Int.Cl.⁷	識別記号	ＦＩ		ﾃｰﾏｺｰﾄﾞ(参考)
Ｈ０５Ｂ　33/00		Ｈ０５Ｂ	33/00	２Ｃ１６２
Ｂ４１Ｊ　2/44			33/02	３Ｋ００７
2/45			33/14	Ａ
2/455		Ｂ４１Ｊ	3/21	Ｌ
Ｈ０５Ｂ　33/02				

審査請求　未請求　請求項の数11　ＯＬ　（全９頁）　最終頁に続く

(21)出願番号　特願2001－366854(P2001－366854)

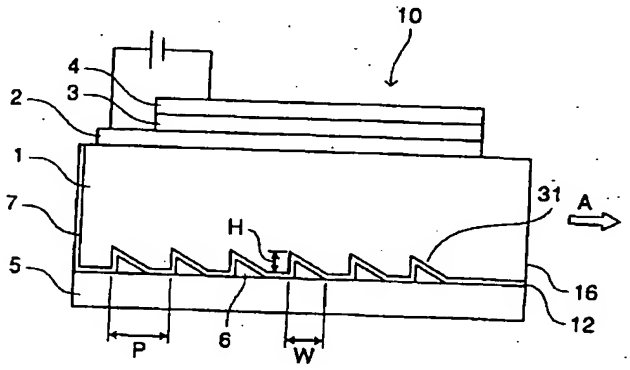
(22)出願日　平成13年11月30日(2001.11.30)

(71)出願人　000005049
シャープ株式会社
大阪府大阪市阿倍野区長池町22番22号
(72)発明者　伴　和夫
大阪府大阪市阿倍野区長池町22番22号　シャープ株式会社内
(72)発明者　山名　真司
大阪府大阪市阿倍野区長池町22番22号　シャープ株式会社内
(74)代理人　100065248
弁理士　野河　信太郎

最終頁に続く

(54)【発明の名称】　有機ＬＥＤ素子

(57)【要約】
【課題】　有機発光層の発光を高い効率で取出すことができる有機ＬＥＤ素子を提供する。
【解決手段】　有機ＬＥＤ素子は、少なくとも有機発光層を含む発光部と、有機発光層の光の入射面および出射面を有し、かつ発光部が入射面に接して配設された導光部と、導光部に入射した有機発光層の光を反射させ出射面から出射させる反射部とを有し、反射部が、光の出射方向に三角形が連続する鋸刃状の断面を有し、かつ前記各三角形の一斜辺が出射面を臨む斜面を形成するように配列された凹凸部からなる。



て配設された導光部と、導光部に入射した有機発光層の光を反射させ出射面から出射させる反射部とを有し、反射部が、光の出射方向に三角形が連続する鋸刃状の断面を有し、かつ前記各三角形の一斜辺が出射面を臨む斜面を形成するように配列された凹凸部からなる有機ＬＥＤ素子が提供される。

【０００８】第１の発明では、導光部へ入射した光が鋸刃状の断面を有する凹凸部の各斜面に反射してただちに出射面（端面）の方向へ進むので、前記光は導光部の内部で反射を繰り返す回数が従来に比べて少なくなる。したがって、光の減衰が抑えられ、導光性基板の端面から大光量を得ることができる。

【０００９】第２の発明によれば、少なくとも有機発光層を含む発光部と、有機発光層の光の入射面および出射面を有し、発光部が入射面に接して配設された導光部と、導光部に入射した有機発光層の光を反射させ出射面から出射させる反射部とを有し、反射部が、導光部にあって入射面に対向する面に形成された反射面であり、導光部が、光の出射方向に三角形が連続する鋸刃状の断面を有し、かつ前記各三角形の一斜辺が反射面を臨む斜面を形成するように配列された凹凸部からなる有機ＬＥＤ素子が提供される。

【００１０】第２の発明では、鋸刃状の断面を有する凹凸部の各斜面からの光が、反射面に入射してただちに出射面（端面）の方向へ進むので、前記光は導光部の内部で反射を繰り返す回数が従来に比べて少なくなる。したがって、光の減衰が抑えられ、導光性基板の端面から大光量を得ることができる。

【００１１】すなわち、第１の発明では、前記凹凸部の各斜面を反射面として用い、これらの反射面の角度や位置等の設定によって、入射面から前記反射面を経て出射面に至る光路の最短化が図れる。また、第２の発明では、前記凹凸部の各斜面を入射面として用い、これらの入射面の角度や位置等の設定によって、前記入射面から反射部を経て出射面に至る光路の最短化が図れる。従来の有機ＬＥＤ素子では、入射面から反射部を経て出射面に至るまでに導光部の内部で反射を繰り返し、かつ導光部に入射した光が出射面以外の表面から漏れ出ることが多かったが、上記したこれらの発明では、凹凸部の各斜面が反射面または入射面として配列されるので、導光部の内部における反射を減らし、かつ出射面以外の表面から漏れ出る光を減らすことができる。したがって、第１および第２の発明では、有機発光層の発光を高い効率で取出すことができる有機ＬＥＤ素子を提供することができる。

【００１２】導光部が、入射面および出射面を除く導光部の少なくとも１つの表面に反射膜または散乱膜を配設されてなるので、導光部から外部へ漏れ出る光を再び導光部内へ戻すことができ、導光部の出射面から大光量を得ることができる。導光部が入射面にプリズムシートを配設されてなるので、導光部へ入射する光の入射角を、好ましくは７０度以下に、小さくできる。これにより、凹凸部により出射面の方向へ反射される光の量が相対的に多くなり、出射面から大光量を得ることができる。つまり、発光部から導光部へ入射する光は通常、等方的であり、かつ凹凸部に当たる光の全量が端面方向へ反射されることはないが、散乱膜を配設することによって入射光の全量に対する凹凸部に当たる光量の比率を高めることができる。

【００１３】この発明では、出射面が、曲面および／または粗面からなる構成が挙げられる。ここで、曲面とは、球面あるいは一方向に湾曲した湾曲面等であり、粗面とは、光を散乱させる表面であり、例えば、表面にすりガラスのような細かい凹凸を形成してもよいし、あるいは液晶で用いられる散乱フィルムを用いてもよい。出射面を単に平面形状とした場合は、導光部と外部との境界での全反射により、一部の光しか外部に取出せないが、出射面を曲面または粗面とすることにより、効率よく多くの光が外部に取出せるようになり、出射面からの発光量を大きくできる。

【００１４】反射膜が、前記斜面に交わる平面に配設されておれば、凹凸部から外部へ漏れ出る光を再び導光部内へ戻すことができ、導光部の出射面から大光量を得ることができる。

【００１５】この発明では、凹凸部が、互いに平行して光の出射方向に延びた少なくとも１つの溝部によって分断され、前記溝部が遮光性樹脂で埋められてなる構成とすることができる。この場合、有機ＬＥＤ素子は、溝部によって分断され、分断されて光の出射方向に延びた凹凸部のそれぞれは、発光する素子の１単位を構成する。したがって、遮光性樹脂を介して隔てられた各素子を光らせた場合、その光が隣の素子の導光部に入り込み、隣の導光部の端面（出射面）を光らせるという、いわゆるクロストーク現象を防ぐことができる。

【００１６】

【発明の実施の形態】以下、図面に示す実施例に基づいてこの発明の実施の形態を説明する。これによってこの発明が限定されるものではない。

実施の形態１

【００１７】この発明の実施の形態１による有機ＬＥＤ素子の一例を図１および図２に示す。図１は有機ＬＥＤ素子１０の側面断面図であり、図２は有機ＬＥＤ素子１０を端面方向から見た図である。

【００１８】図１および図２に示すように、有機ＬＥＤ素子１０は、基板５上に、反射膜７および、凹凸部６を底面１２に有する導光部１がこの順に積層され、さらに導光部１上に、陽極２、有機ＬＥＤ膜３および陰極４からなる発光部がこの順に形成されてなる。基板５は、透光性または非透光性の基板が使用できる。基板５の材料は、従来の有機ＬＥＤ素子に使用されているものであれ

面）に、長さ１０ｍｍ、幅３ｍｍ、厚み１５０ｎｍにＩＴＯ２２を堆積して陽極を形成した。次いで、幅８ｍｍ、長さ８ｍｍに、ホール輸送層として４，４－ビス［Ｎ－（１－ブチル）－フェニルアミノ］ビフェニル２８（以下、ＮＰＢ２８と称する）、発光層としてトリス（８－ヒドロキシキノリナト）アルミニウム２９（以下、Ａｌｑ３　２９と称する）を順次、蒸着速度０．２ｎｍ／ｓｅｃで膜厚が各々５０ｎｍになるように形成した。

【００３１】最後に、陰極として、幅５ｍｍ、長さ６ｍｍのＡｌＬｉ合金２４を積層した。これにより、図３に示す有機ＬＥＤ素子１０を得た。なお、得られた有機ＬＥＤ素子１０は、図１および図２に示した基板５を設けなかった。この有機ＬＥＤ素子１０の両電極２２、２４の間に１０Ｖの電圧を印加したところ、端面１６から約０．８μＷの光を検出した。

【００３２】（比較例１）まず、導光部１となる長さ１０ｍｍ、幅５ｍｍ、厚さ３ｍｍのポリカーボネイト板の底面（裏面）に、厚さ２００ｎｍのアルミ反射膜を形成した。次いで、実施例１でおこなったのと同様の方法で、図１２に示した従来構成の有機ＬＥＤ素子１００を作製した。作製された有機ＬＥＤ素子１００は、凹凸部６となるストライプ状の切れ込みがない点でこの発明の有機ＬＥＤ素子１０と異なる。上記の従来構成の有機ＬＥＤ素子１００の両電極間に１０Ｖの電圧を印加したところ、端面から約０．５μＷの光を検出した。

【００３３】端面から検出された光は、この発明の素子１０と、従来構成の素子１００との間で約０．３μＷの差があり、本発明の構成により、導光部１の端面１６からより大きい光量が得られることが明らかになった。

【００３４】図４は、凹凸部６における散乱性を得るために、液晶などで使われるプリズムシート８を導光部１の入射面に貼り付けた場合の導光部１への入射光を示す。

【００３５】図４において、プリズムシート８は、液晶で用いられている２枚のプリズムレンズフイルムを互いの三角柱プリズムの中心線が直交するように重ね、これを導光部１と陽極２の間に配設したものである。このようなプリズムシート８としては、例えば、市販されている輝度上昇フィルム（例えば、３Ｍ社製の商品名「ＢＥＦII」）を用いることができる。

【００３６】図４に示すように、有機ＬＥＤ膜３で発光して陽極２から出た等方的な光を、２枚のプリズムシート８に通すことにより、導光部１に入射角αが７０度以下の光を多く入射させることができる。したがって、導光部１の底面に形成した三角柱形状の斜面３１で反射される光のうち、端面１６方向に反射される割合が大きくなるので、端面１６からの発光量を大きくすることができる。なお、導光部１には、入射面および出射面（端面１６）を除く導光部１の表面に反射膜または散乱膜が形成される。

【００３７】なお、図１の実施の形態１において、端面１６を曲面またはレンズ形状にしてもよい。このような形状を得るには、例えば、表面に球面または曲面を形成したプラスチックフイルムまたはプラスチック板あるいは光散乱板を貼り合わせればよい。つまり、端面１６が平面になっておれば、導光部３２と空気の界面で全反射が生じ、約４０度以下の入射角で入射した光しか導光部１の外に出射されないが、上記のように、端面１６表面に球面または曲面を形成することにより、さらに多くの光を端面１６から取り出すことができる。

【００３８】さらに、図１の実施の形態１の凹凸部６において、その断面となる直角三角形がその大きさ（つまり高さ）が互いに異なっていてもよい。例えば、三角柱の入射方向における高さが端面１６に近づくにしたがって低くなるよう三角柱状の凹部または凸部を配列することにより、端面１６から遠い位置に形成された直角三角形の凹凸部６の斜面３１で反射した光が、端面１６に近い位置に形成された直角三角形の凹凸部６によって遮られることなく端面１６方向へ反射させることができる。

【００３９】実施形態２

この発明の実施の形態２に係る有機ＬＥＤ素子の一例を、図５の断面図、図５におけるＸ－Ｘ’断面を端面側から見た図６の断面図およびその製造工程を説明する図７の断面図に示す。

【００４０】図５および図６に示すように、有機ＬＥＤ素子２０は、基板５上に、反射膜７および複数の三角形の凹凸部６を底面に有する導光部１、陽極２、有機ＬＥＤ膜３および陰極４がこの順に積層されてなる。有機ＬＥＤ素子２０が、実施の形態１による有機ＬＥＤ素子１０と異なる点は、図５に示すように、凹凸部６が、互いに平行して光の出射方向Ａに延びた複数の溝部１１を有するとともに、溝部１１が遮光性樹脂１３で埋められている点である。遮光性樹脂１３は、液晶ディスプレイで用いられるブラックマトリックス用の黒色樹脂等の吸光性を有する樹脂が挙げられる。また、遮光性樹脂１３の代わりにアルミニウムや金などの反射性金属膜を溝部１１の側面または導光部１の側面および底面に約５０nm以上形成した後、溝部１１を透明または非透明な樹脂で埋めてもよい。有機ＬＥＤ素子２０では、遮光性樹脂１３が黒色のブラックマトリックス用樹脂からなり、溝部１１および遮光性樹脂１３によって基板５上に複数のストライプ状の導光部１が出射方向Ａに沿って区画形成され、１条のストライプ状の発光素子が構成される。

【００４１】有機ＬＥＤ素子２０は、区画形成された各導光部１上に、ＩＴＯなどの透明導電膜からなる陽極２が５０～４００ｎｍの膜厚でストライプ状に形成され、次に、陽極２のストライプ状の透明導電膜を跨って有機ＬＥＤ膜３が５０～４００ｎｍの膜厚で形成され、陰極４が５０～４００ｎｍの膜厚に形成されている。陽極２

部２６が、図９に示すように、互いに平行して光の出射方向Ａに延びた複数の溝部１１を有するとともに、溝部１１が遮光性樹脂１３で埋められている点である。遮光性樹脂１３は、液晶ディスプレイで用いられるブラックマトリックス用の黒色樹脂等の吸光性を有する樹脂が挙げられる。

【００５５】有機ＬＥＤ素子４０では、遮光性樹脂１３が黒色のブラックマトリックス用の樹脂からなり、溝部１１および遮光性樹脂１３によって基板５上に複数のストライプ状の導光部１が出射方向Ａ（図１０）に沿って区画形成され、１条のストライプ状の発光素子が構成される。

【００５６】有機ＬＥＤ素子４０は、区画形成された各導光部１上に、ＩＴＯなどの透明導電膜からなる陽極２が５０～４００ｎｍの膜厚でストライプ状に形成され、次に、陽極２のストライプ状の透明導電膜を跨って有機ＬＥＤ膜３が５０～４００ｎｍの膜厚で形成され、陰極４が５０～４００ｎｍの膜厚に形成されている。陽極２を形成する各透明導電膜は、図９および図１０に示すように、各導光部１に対応した陽極用端子１５と電気的に接触するように形成され、陰極４は、陰極用端子１４と電気的に接触するように形成される。なお、陰極４はすべての導光部１をまたがるように１本で形成してもよいし、２つの互いに断線した陰極４として形成してもよい。

【００５７】実施の形態４による有機ＬＥＤ素子４０では、任意の端子１５と共通の端子１４の間に電圧を印加することにより、選択した発光素子の陽極２と陰極４に挟まれた有機ＬＥＤ膜３を発光させ、導光部１の端面１６から出射することができる。このようなアレイ状の端面発光型有機ＬＥＤ膜３を発光させることにより、薄型の光ヘッドが提供できる。有機ＬＥＤ素子４０は、実施の形態３に係る有機ＬＥＤ素子３０と同様に、従来の有機ＬＥＤ素子に比べて端面１６から大きな発光量を得ることができた。

【００５８】前記したように、実施の形態３および実施の形態４では、各凹凸部における断面が三角形部分を入射面として用い、これらの入射面の角度や位置等の設定によって、前記入射面から反射部を経て出射面（端面１６）に至る光路の最短化が図れる。

【００５９】実施の形態１～４による有機ＬＥＤ素子では、従来の端面発光型有機ＬＥＤ素子に比べた場合、同じ電圧を印加したときに大きな発光パワーが得られるようになる。したがって、実施の形態１～４による有機ＬＥＤ素子を用いた端面発光型有機ＬＥＤアレイを構成すれば、従来のアレイに比べて、感光体表面を感光させるために必要なパワーを低い電圧で得ることができ、低消費電力型のアレイを提供できる。また、低電圧で発光素子を駆動できるので、従来に比べて長寿命で信頼性の高いアレイを提供できる。

【００６０】

【発明の効果】第１の発明では、導光部へ入射した光が鋸刃状の断面を有する凹凸部の各斜面に反射してただちに出射面の方向へ進むので、前記光は導光部の内部で反射を繰り返す回数が従来に比べて少なくなる。したがって、光の減衰が抑えられ、導光性基板の端面から大光量を得ることができる。

【００６１】第２の発明では、鋸刃状の断面を有する凹凸部の各斜面からの光が、反射面に入射してただちに出射面の方向へ進むので、前記光は導光部の内部で反射を繰り返す回数が従来に比べて少なくなる。したがって、光の減衰が抑えられ、導光性基板の端面から大光量を得ることができる。

【図面の簡単な説明】

【図１】実施形態１の有機ＬＥＤ素子の側面断面図である。

【図２】図１の有機ＬＥＤ素子を端面方向から見た断面図である。

【図３】図１の有機ＬＥＤ素子の作製例を示す断面図である。

【図４】図１の有機ＬＥＤ素子の要部拡大図である。

【図５】実施形態２の有機ＬＥＤ素子を端面方向から見た側面断面図である。

【図６】図５のＸ－Ｘ’断面図である。

【図７】図５の有機ＬＥＤ素子の作製工程を示す断面で図である。

【図８】実施形態３の有機ＬＥＤ素子の側面断面図である。

【図９】実施形態４の有機ＬＥＤ素子を端面方向から見た側面断面図である。

【図１０】図９のＸ－Ｘ’断面図である。

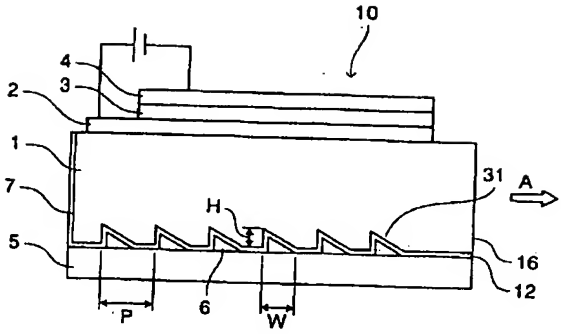
【図１１】従来の有機ＬＥＤ素子の構成を示した側面断面図である。

【符号の説明】

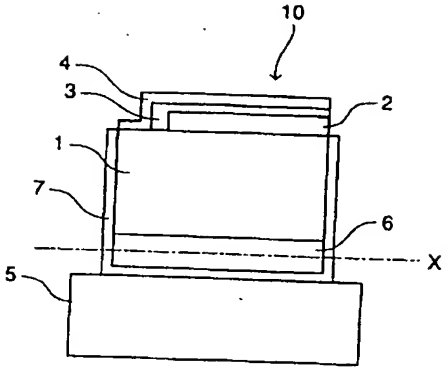
１　導光部
２　陽極
３　有機ＬＥＤ膜
４　陰極
５　基板
６　凹凸部（反射部）
７　反射膜
８　プリズムレンズフイルム（散乱膜）
１０　有機ＬＥＤ素子
１１　溝部
１３　遮光性樹脂
１４　電極用端子
１６　端面（出射面）
２０　有機ＬＥＤ素子
２６　凹凸部
３０　有機ＬＥＤ素子

40 有機ＬＥＤ素子

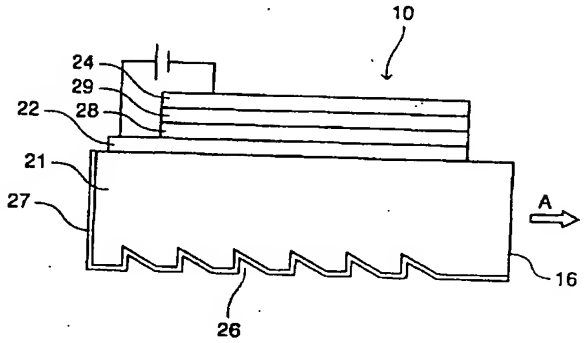
【図１】



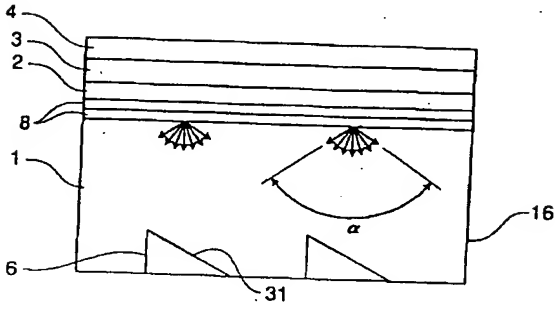
【図２】



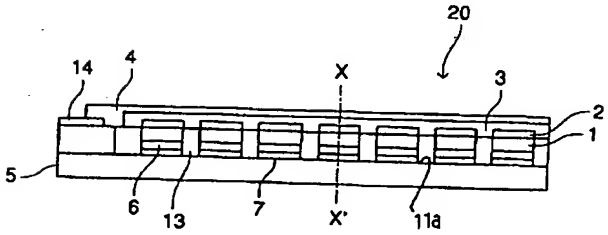
【図３】



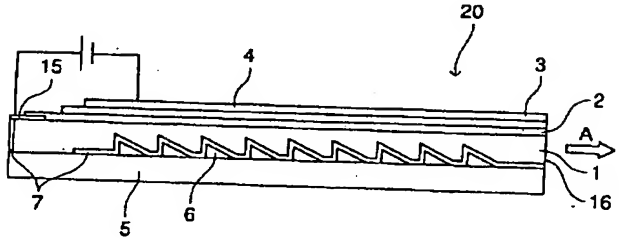
【図４】



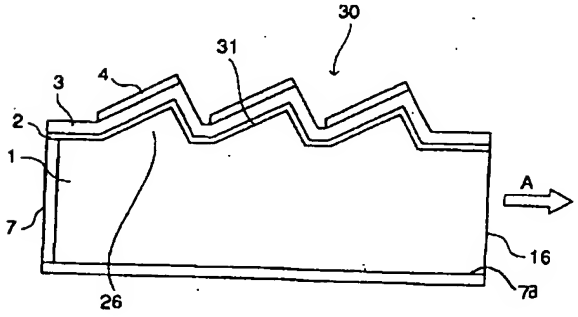
【図５】



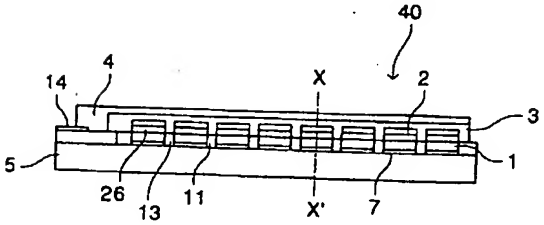
【図６】



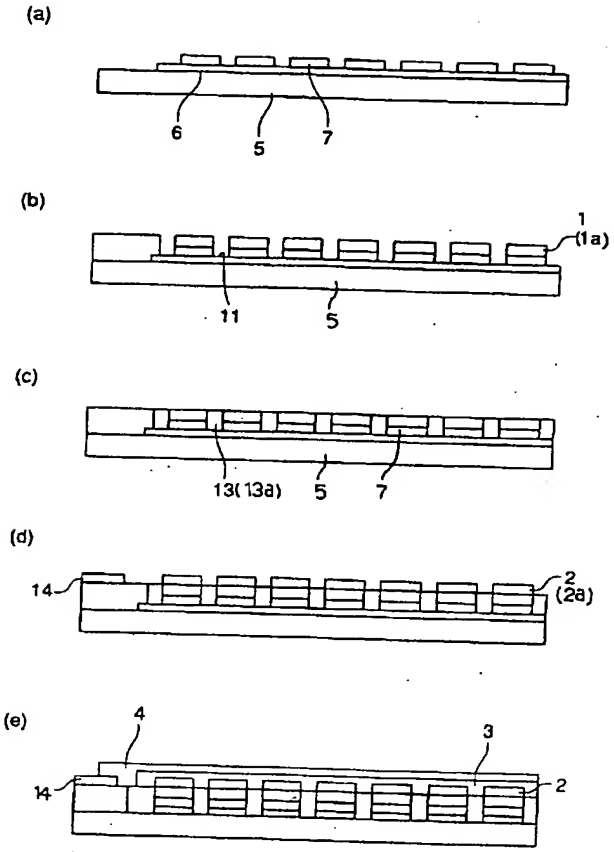
【図８】



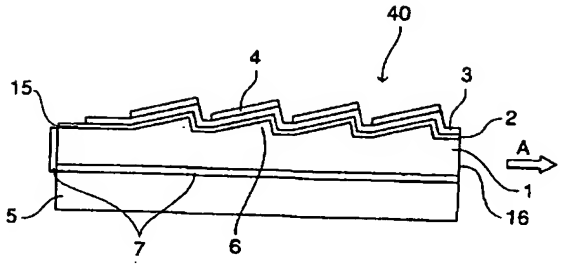
【図９】



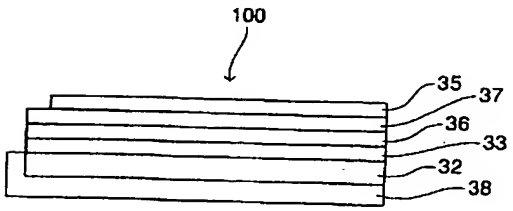
【図7】



【図10】



【図11】



フロントページの続き

(51) Int.Cl.[7]	識別記号	FI	テーマコード(参考)
H05B 33/14			

(72)発明者 川瀬 徳隆
大阪府大阪市阿倍野区長池町22番22号 シャープ株式会社内

Fターム(参考) 2C162 AE03 FA04 FA16 FA23
3K007 AB03 BB06 DB03

CLAIMS

(Claim(s))]
(Claim 1] The light guide section in which it has the light-emitting part which contains an organic luminous layer at least, and the entrance plane and the Idei side of light of an organic luminous layer, and the light-emitting part was arranged in contact with the entrance plane, The organic LED element which consists of a concavo-convex part arranged so that the slope which it has the reflective part which is made to reflect the light of the organic luminous layer which entered into the light guide section, and acts as Idei from the Idei side, and a reflective part has the section of the shape of a serrated knife by which a triangle continues in the outgoing radiation direction of light, and one oblique side of said three square shapes each faces the Idei side might be formed.
(Claim 2] The light-emitting part which contains an organic luminous layer at least, and the light guide section in which it has the entrance plane and the Idei side of light of an organic luminous layer, and the light-emitting part was arranged in contact with the entrance plane, It has the reflective part which is made to reflect the light of the organic luminous layer which entered into the light guide section, and acts as Idei from the Idei side. The organic LED element which consists of a concavo-convex part arranged so that the slope which it is the reflective surface formed in the field where a reflective part is in a light guide section, and counters an entrance plane, and a light guide section has the section of the shape of a serrated knife by which a triangle continues in the outgoing radiation direction of light, and one oblique side of said three square shapes each faces a reflective surface might be formed.
(Claim 3] The organic LED element according to claim 1 or 2 which has it come to arrange a reflective film or a dispersion film in at least one surface of the light guide section excluding [a light guide section] an entrance plane and the Idei side.
(Claim 4] A light guide section is an organic LED element according to claim 1 or 2 which has it an entrance plane come to arrange a prism sheet.
(Claim 5] The organic LED element according to claim 4 to which a prism sheet controls the incidence angle of the light which enters into a light guide section at 70 or less degrees.
(Claim 6] The organic LED element according to claim 1 or 2 which the Idei side becomes from a curved surface and/or a rough side.
(Claim 7] The organic LED element according to claim 3 which it comes to arrange in the plane at which a reflective film crosses said slope.
(Claim 8] The organic LED element according to claim 1 or 2 from which it is divided by at least one slot where the concavo-convex part was mutually parallel, and was prolonged in the outgoing radiation direction of light, and comes to bury said slot by light-sheilding resin.
(Claim 9] The organic LED element according to claim 1 or 2 which has the section of the shape of a serrated knife which continues so that it may become low as height [in / in a concavo-convex part / the incidence direction of said three square shapes each] approaches the Idei side.
(Claim 10] The organic LED element which it comes to form on the substrate which an organic LED element according to claim 1 or 2 touches on the surface which counters the entrance plane of a light guide section.
(Claim 11] The organic LED array which arranges two or more organic LED elements of any one description of claim from Claim 1.

DETAILED DESCRIPTION

(Detailed Description of the Invention]
(0001]
(Industrial Application] Especially this invention relates to the **** luminescence type organicity LED element used for optical heads, such as a printer and a copying machine, about an organic LED (Light Emitting Device) element.

0002]
Description of the Prior Art] While an information society, progresses in recent years, the small laser printer for ersonal is used widely. A laser printer combines a semiconductor laser and a polygon mirror, and has the optical nechanism in which the optical head which emits laser light is made to scan on a photo conductor side. However, since the space for making laser light scan was needed, the miniaturization was difficult for this optical nechanism. Then, the optical mechanism which used the organic LED element for the optical head is developed as what is replaced with this mechanism (see the **** luminescence type organicity LED element of a description etc. to JP,H10-208874,A).
0003] An example of the composition of the above-mentioned **** luminescence type organicity LED element is shown in drawing 11 . It comes to form the organic LED multilayer film and the negative pole 35 which consist of he anode 33 and the hole transportation layer 36 which consist of a transparent electric conduction film, and an organic luminous layer 37 with the **** luminescence type organicity LED element 100 of drawing 11 at this order on the glass substrate 32. Moreover, the reflective film 38 is arranged in the back of the glass substrate 32.

0004] With the above-mentioned organic LED element 100, if voltage is impressed between two electrodes 33 nd 35, the organic luminous layer 37 will emit light and this light will go into the glass substrate 32 through an node 33. The glass substrate 32 is playing a role of a light guide section, while the light which acted as Idei from he organic luminous layer 37 repeats a reflection between the reflective film 38 and the negative pole 35, it asses through the inside of the glass substrate 32, and luminescence produces it from **** of the glass ubstrate 32. Since a thin optical head is producible by arranging such a **** luminescence type organicity LED lement 100 in the shape of an array [two or more], the large miniaturization of a printer etc. is attained.
0005]
Problem to be solved by the invention] It is necessary to impress very high voltage to an organic LED multilayer ilm with the organic LED element of structure conventionally [above mentioned] making the light of light volume equired to expose the photo conductor surface emit light from **** of a glass substrate. As a result, the power onsumption for making the organic LED element 100 drive became large, and there was a problem that the life of n organic LED element became very short, by impressing the high voltage further.
0006] This invention is made in consideration of the above-mentioned problem, and aims at offering the organic ED element which can take out luminescence of an organic luminous layer at high efficiency.
0007]
Means for solving problem] The light guide section in which according to the 1st invention it has the light-mitting part which contains an organic luminous layer at least, and the entrance plane and the Idei side of light of n organic luminous layer, and the light-emitting part was arranged in contact with the entrance plane, The rganic LED element which consists of a concavo-convex part arranged so that the slope which it has the eflective part which is made to reflect the light of the organic luminous layer which entered into the light guide ection, and acts as Idei from the Idei side, and a reflective part has the section of the shape of a serrated knife y which a triangle continues in the outgoing radiation direction of light, and one oblique side of said three square hapes each faces the Idei side might be formed is offered.
0008] In the 1st invention, since the light which entered into the light guide section reflects in each slope of the oncavo-convex part which has a serrated knife-like section and it progresses in the direction of the Idei side ****) immediately, the number of times of said light which repeats a reflection decreases compared with the ormer inside a light guide section. Therefore, attenuation of light is suppressed and large light volume can be btained from **** of a light guide nature board.
0009] The light-emitting part which contains an organic luminous layer at least according to the 2nd invention, nd the light guide section in which it has the entrance plane and the Idei side of light of an organic luminous ayer, and the light-emitting part was arranged in contact with the entrance plane, It has the reflective part which made to reflect the light of the organic luminous layer which entered into the light guide section, and acts as lei from the Idei side. It is the reflective surface formed in the field where a reflective part is in a light guide ection, and counters an entrance plane, and the organic LED element which consists of a concavo-convex part rranged so that a light guide section might form the slope which it has the section of the shape of a serrated nife by which a triangle continues in the outgoing radiation direction of light, and one oblique side of said three quare shapes each faces a reflective surface is offered.
0010] In the 2nd invention, since the light from each slope of the concavo-convex part which has a serrated nife-like section enters into a reflective surface and progresses in the direction of the Idei side (****) mediately, the number of times of said light which repeats a reflection decreases compared with the former side a light guide section. Therefore, attenuation of light is suppressed and large light volume can be obtained om **** of a light guide nature board.
0011] That is, in the 1st invention, shortest-ization of **** from the entrance plane to [with a setup of the ngle of these reflective surfaces, a position, etc.] the Idei side through said reflective surface can be attained,

using each slope of said concavo-convex part as a reflective surface. Moreover, in the 2nd invention, shortest-zation of **** from said entrance plane to [with a setup of the angle of these entrance planes, a position, etc.] he Idei side through a reflective part can be attained, using each slope of said concavo-convex part as an entrance plane. Although the light which repeated the reflection inside the light guide section from the entrance plane to the Idei side through the reflective part, and entered into the light guide section leaked and came out from the surfaces other than the Idei side with the conventional organic LED element in many cases In these above-mentioned invention, since each slope of a concavo-convex part is arranged as a reflective surface or an entrance plane, the reflection in the inside of a light guide section can be reduced, and the light which leaks and comes out from the surfaces other than the Idei side can be reduced. Therefore, in the 1st and 2nd invention, the organic LED element which can take out luminescence of an organic luminous layer at high efficiency can be offered.

0012] Since a light guide section has it come to arrange a reflective film or a dispersion film in at least one surface of the light guide section except an entrance plane and the Idei side, the light which leaks and comes out from a light guide section to the exterior can be again returned into a light guide section, and large light volume can be obtained from the Idei side of a light guide section. Since a light guide section has it an entrance plane come to arrange a prism sheet, the incidence angle of the light which enters into a light guide section can be preferably made small at 70 or less degrees. The quantity of light reflected in the direction of the Idei side by the concavo-convex part increases relatively by this, and large light volume can be obtained from the Idei side. That s, the light which enters into a light guide section from a light-emitting part is usually isotropic, and although the whole quantity of the light which strikes upon a concavo-convex part is not reflected in the **** direction, the atio of the light volume which hits the concavo-convex part to the whole quantity of incidence light can be aised by arranging a dispersion film.

0013] In this invention, the composition which the Idei side becomes from a curved surface and/or a rough side s mentioned. Here, you may use the dispersion film which a curved surface is a curve side which curved to the urface of a sphere or one way, and a rough side is the surface over which light is scattered, may form fine nevenness like pickpocket glass in the surface, or is used by a liquid crystal. By the total internal reflection in he boundary of a light guide section and the exterior, when the Idei side is only made into plane form, although it annot take out to some optical deer exteriors, by making the Idei side into a curved surface or a rough side, nuch light can take out now outside efficiently and the amount of luminescence from the Idei side can be nlarged.

0014] If the reflective film is arranged in the plane which crosses said slope, the light which leaks and comes out rom a concavo-convex part to the exterior can be again returned into a light guide section, and large light olume can be obtained from the Idei side of a light guide section.

0015] In this invention, a concavo-convex part is divided by at least one slot which was mutually parallel and xtended in the outgoing radiation direction of light, and said slot can have composition which it comes to bury by ght-sheilding resin. In this case, each of the concavo-convex part which the organic LED element was divided by ne slot, and was divided and was prolonged in the outgoing radiation direction of light constitutes one unit of the lement which emits light. Therefore, when each element separated through light-sheilding resin is shone, the ght enters into the light guide section of the next element, and what is called a cross talk phenomenon of shining *** (Idei side) of the next light guide section can be prevented.

0016]

Mode for carrying out the invention] Based on the example shown in Drawings, the form of implementation of nis invention is explained hereafter. This invention is not limited by this.

he form 1 of operation [0017] An example of the organic LED element by the form 1 of implementation of this nvention is shown in drawing 1 and drawing 2 . Drawing 1 is the side sectional view of the organic LED element 0, and drawing 2 is the figure which looked at the organic LED element 10 from ****.

0018] As shown in drawing 1 and drawing 2 , the light guide section 1 in which the organic LED element 10 has ne reflective film 7 and the concavo-convex part 6 on the bottom 12 at a substrate 5 top is laminated by this rder, and it comes further to form the light-emitting part which consists of an anode 2, an organic LED film 3, nd the negative pole 4 on a light guide section 1 at this order. The substrate of light transmission nature or non-ght transmission nature can be used for a substrate 5. If the material of the substrate 5 is used for the onventional organic LED element, it will not be limited in particular and organic material, such as charges of non-quipments, such as quartz, soda glass, and ceramic material, polyimide resin, polyester resin, Pori Karbo Nate esin, and an acrylic resin, will be mentioned.

0019] The reflective film 7 is formed in the side of the light guide section 1 except the Idei side, and the surface f the concavo-convex part 6 in order to raise the reflexibility in the concavo-convex part 6 further. The eflective film 7 is formed, for example so that film thickness may be set to 50nm or more in aluminum. A light uide section 1 is constituted as an optical component which consists of light transmission nature material, such s plus CHIKKUSU or photo-setting resins, such as PMMA and Pori Karbo Nate, thermosetting resin, or glass,

and is a rectangular parallelepiped which has the 6th parallel page mutually in this example. An anode 2 consists of transparency electric conduction films, such as ITO, and the film thickness is 50-400nm.

[0020] The organic LED film 3 constitutes the light-emitting part which has the monolayer or multilayer which contains an organic luminous layer at least. Low-molecular material and a polymer material are mentioned as a material of the organic LED film 3. As the above-mentioned low-molecular material, a well-known material indicated to JP,H3-152897,A, JP,H5-70773,A, JP,H5-198377,A, JP,H5-214332,A, JP,H6-172751,A, etc. can be used.

[0021] To the above-mentioned polymer material, as a hole transportation layer, moreover, for example, Pori aniline and its derivative, Can use Pori CHIOFEN and its derivative, a PORIBI roll and its derivative, polyethylene dioxythiophene, the polyethylene dioxythiophene that added polystyrene sulfonate, etc., and as a luminescent material for example The thing of a description, Pori Feni Wren and ******, Pori phenylenevinylene and its derivative, Pori full OREN, its derivative, etc. can be used for JP,H8-188641,A, JP,2000-504774,A, etc.

[0022] When making the organic LED film 3 into multilayer structure, generally it consists of anode 2 sides so that each class of a hole transportation layer / luminous layer, a hole pouring layer / hole transportation layer / luminous layer, or a hole pouring layer / hole transportation layer / luminous layer / electronic transportation layer may be included, but it is not limited to this. Above-mentioned each class is usually formed in a thickness of -500nm.

[0023] The negative pole 4 can use the metal in which a work function is smaller than 4eV, for example. As such metal, Ca, Ba, aluminum, Mg, Ag, etc. the alloy of Mg, Ag, aluminum, Li and Li, F and Ca, and F, etc. are mentioned. The negative pole 4 is formed in 50-400nm film thickness. in order [in addition,] to raise pouring of the electron from the negative pole 4 to the organic LED film 3 between the negative pole 4 and the organic LED film 3 -- LiF and SiO2 etc. -- you may form in 0.1-100nm in thickness.

[0024] The concavo-convex part 6 is arranged so that the slope which it is formed in the surface (bottom 12) which counters the entrance plane of a light guide section 1, and has the section of the shape of a serrated knife by which a triangle continues in the outgoing radiation direction (the arrow A of drawing 1 shows the luminescence direction) A of light, and one oblique side 31 of said three square shapes each faces **** 16 (Idei side) may be formed.

[0025] Each triangle section portion which forms the above-mentioned concavo-convex part 6 constitutes the right-angled triangular prism form which has the side prolonged in the direction which uses a triangle as the bottom and intersects perpendicularly in the outgoing radiation direction of light. As shown in drawing 2 , this triangular prism is prepared so that the center line X of the side of a triangular prism may become parallel to **** 6. Each of the slope 31 of a triangle section is arranged so that incidence light may reflect in **** 16 which is the Idei side. The interval P of height [of the above-mentioned right triangle] H, width W, length and an angle, or triangular prisms is set up so that the amount of luminescence from **** 16 may become the largest according to the height, width, and length of the cube which constitutes a light guide section 1. Such a concavo-convex part 6 is producible as a resin fabrication member to a light guide section 1 and one using an injection-molding method, for example.

[0026] The surface of the concavo-convex part 6 has reflexibility or dispersion nature to incidence light. Moreover, the side of the light guide section 1 except **** 16 also has reflexibility or dispersion nature. It can prevent that light escapes from and comes out outside from the surface of light guide sections 1 other than **** 6 with the characteristic of the surface of these light guide sections 1.

[0027] With the form 1 of the aforementioned operation, if voltage is impressed between an anode 2 and the negative pole 4, two electrodes 2 and the organic LED film 3 inserted into 4 emit light, and the light will enter into a light guide section 1, will reflect in the concavo-convex part 6 further, and it will act as Idei from **** 16.

[0028] In addition, [forming the reflective film 7 in the bottom 12 of a light guide section 1 / as described above, the well-known technology, but] With such conventional composition, as shown in drawing 12, since the base 32 is a light-guide layer is monotonous, when a great portion of light does not progress in the **** direction but repeats a reflection between the reflective film 38 and the negative pole 35, light declines and the light volume taken out from **** by it becomes small. [however, the light which emitted light from the organic LED element 3 once two or more triangular prism form in which a slope 31 faces the bottom of a light guide section 1 the **** 3 side was formed with the organic LED element 10] Since it reflects in the **** 16 direction on the triangular prism-shaped slope 31 and progresses in the **** 16 direction after entering into a light guide section 1, compared with the conventional composition, the big amount of luminescence in **** 16 can be obtained.

[0029] The example of the organic LED element 10 of the form 1 of operation and the comparative example by the conventional technology are explained below, referring to drawing 3 .

Example 1) The ten cut (concavo-convex part 26) of the shape of a stripe 0.3mm in height used as a concavo-convex part and 0.4mm in width was first formed in the undersurface (back) of the Pori Karbo Nate board 21 with 0mm in length used as a light guide section 1, 5mm [in width], and a thickness of 3mm at intervals of 0.4mm. Subsequently, the aluminum reflective film 27 was formed in the field and the side which the cut was formed, by

200nm of film thickness.
[0030] ITO22 was deposited on 10mm in length, 3mm in width, and 150nm in thickness, and the anode was formed n the upper surface (surface) of the above-mentioned Pori Karbo Nate board 21. In 8mm in width, and length of 3mm, as a hole transportation layer Subsequently, 4 and 4-screw [N -(1-butyl)- phenylamino] BIFENIRU 28 As NPB28 is called hereafter) and a luminous layer, one by one, tris (8-hydroxyquinolinate) aluminum 29 (Alq 3 29 is called hereafter) was formed so that film thickness might be respectively set to 50nm at 0.2nm/sec in vapor deposition speed.
[0031] Finally the AlLi alloy 24 5mm in width and 6mm in length was laminated as the negative pole. This obtained he organic LED element 10 shown in drawing 3 . In addition, the obtained organic LED element 10 did not form he substrate 5 shown in drawing 1 and drawing 2 . When the voltage of 10V was impressed between the two electrodes 22 of this organic LED element 10, and 24, about 0.8-microwatt light was detected from **** 16.
[0032] (Comparative example 1) The 200-nm-thick aluminum reflective film was first formed in the bottom (back) of the Pori Karbo Nate board with 10mm in length used as a light guide section 1, 5mm [in width], and a hickness of 3mm. Subsequently, the organic LED element 100 of composition was produced by the method same with having carried out in the example 1 conventionally which was shown in drawing 12. The produced organic LED element 100 differs from the organic LED element 10 of this invention in that there is no cut of the shape of stripe used as the concavo-convex part 6. When the voltage of 10V was impressed between the two electrodes of the organic LED element 100 of the above-mentioned conventional composition, about 0.5-microwatt light was detected from ****.
[0033] The light detected from **** has about 0.3-microwatt difference between the elements 100 of composition the element 10 of this invention, and conventionally, and it became clear that larger light volume is obtained from **** 16 of a light guide section 1 by the composition of this invention.
[0034] Drawing 4 shows the incidence light to the light guide section 1 at the time of sticking on the entrance lane of a light guide section 1 the prism sheet 8 used by a liquid crystal etc., in order to obtain the dispersion ature in the concavo-convex part 6.
[0035] In drawing 4 , the prism sheet 8 piles up the two prism lens film used by the liquid crystal so that the enter line of a mutual triangular prism prism may intersect perpendicularly, and it arranges this between a light uide section 1 and an anode 2. As such a prism sheet 8, the luminosity rise film (for example, brand name by 3M ompany "BEFII") marketed can be used, for example.
[0036] As shown in drawing 4 , the incidence angle alpha can enter the light of 70 or less degrees in a light guide ection 1 mostly by emitting light by the organic LED film 3, and letting direction light, such as having come out of ne anode 2, pass on the prism sheet 8 of two sheets. Therefore, since the rate reflected in the **** 16 direction mong the light reflected on the slope 31 of the triangular prism form formed in the bottom of a light guide ection 1 becomes large, the amount of luminescence from **** 16 can be enlarged. In addition, a reflective film r a dispersion film is formed in the surface of the light guide section 1 except an entrance plane and the Idei side **** 16) at a light guide section 1.
[0037] In addition, in the form 1 of operation of drawing 1 , you may make **** 16 into a curved surface or lens orm. What is necessary is just to stick the plastic film, the plastic sheet, or the light scattering board in which ne surface of a sphere or the curved surface was formed on the surface, for example, in order to acquire such orm. That is, if **** 16 is a plane, will act as Idei only of the light which total internal reflection arose in the nterface of a light guide section 32 and air, and entered by the incidence angle of about 40 or less degrees out of light guide section 1, but as mentioned above By forming a surface of a sphere or a curved surface in the **** 6 surface, further much light can be taken out from **** 16.
[0038] Furthermore, in the concavo-convex part 6 of the form 1 of operation of drawing 1 , the size (that is, eight) may differ in the right triangle used as the section mutually. For example, by arranging triangular prism-like crevice or a convex part so that it may become low as the height in the incidence direction of a triangular prism pproaches **** 16 It can be made to reflect in the **** 16 direction, without the light reflected on the slope 31 the concavo-convex part 6 of the right triangle formed in the position distant from **** 16 being interrupted / the concavo-convex part 6 of the right triangle formed in the position near **** 16.
[0039] the embodiment 2 -- it is shown in the sectional view of drawing 7 R> 7 explaining the sectional view of awing 6 which looked at the X-X' section [in / for an example of the organic LED element concerning the form of implementation of this invention / the sectional view of drawing 5 , and drawing 5] from the **** side, and s manufacturing process.
[0040] As shown in drawing 5 and drawing 6 , this order comes to laminate the light guide section 1 to which the ganic LED element 20 has the reflective film 7 and the concavo-convex part 6 of two or more triangles on the ttom on a substrate 5, an anode 2, the organic LED film 3, and the negative pole 4. It is a point that the slot 11 fill uped with light-sheilding resin 13 while having two or more slots 11 where the concavo-convex part 6 was utually parallel, and was prolonged in the outgoing radiation direction A of light, as the point that the organic ED element 20 differs from the organic LED element 10 by the form 1 of operation is shown in drawing 5 . The

resin which has ******, such as black resin for black matrices for which light-sheilding resin 13 is used with a iquid crystal display, is mentioned. Moreover, a slot 11 may be fill uped with transparent or un-transparent resin after forming about 50nm or more of reflexibility metal membranes, such as aluminum and gold, in the side of a slot 11 or the side of a light guide section 1, and the bottom instead of light-sheilding resin 13. Light-sheilding resin 13 consists of black resin for black matrices, division formation of the light guide section 1 of the shape of two or more stripe is carried out along the outgoing radiation direction A on a substrate 5 with a slot 11 and ight-sheilding resin 13, and the light emitting element of the shape of a stripe of one articles consists of organic _ED elements 20.

0041] The organic LED element 20 is formed in the shape of a stripe on each light guide section 1 by which division formation was carried out by the film thickness whose anode 2 which consists of transparent electric conduction films, such as ITO, is 50-400nm. Next, the transparent electric conduction film of the shape of a stripe of an anode 2 is straddled, the organic LED film 3 is formed by the film thickness which is 50-400nm, and the negative pole 4 is formed in the film thickness which is 50-400nm. As each transparent electric conduction film which forms an anode 2 is shown in drawing 5 and drawing 6 , it is formed so that the terminal 15 for anodes corresponding to each light guide section 1 may be contacted electrically, and the negative pole 4 is formed so that the terminal 14 for the negative poles may be contacted electrically. In addition, the negative pole 4 may be formed by one so that all the light guide sections 1 may be straddled, and you may form it as the two negative poles 4 disconnected mutually.

0042] With the organic LED element 20 by the form 2 of operation, by impressing voltage between the arbitrary terminals 15 and the common terminal 14, the organic LED film 3 inserted into the anode 2 and the negative pole 4 of the selected light emitting element can be made to be able to emit light, and it can be emitted from **** 16 of a light guide section 1. A thin optical head can be offered by making the **** luminescence type organicity _ED film 3 of the shape of such an array emit light. The organic LED element 20 was able to obtain the big amount of luminescence from **** like the organic LED element 10 by the form 1 of operation compared with the conventional organic LED element.

0043] An example of a method which manufactures the organic LED element 20 using the conventional technology is explained based on the flowchart shown in drawing 7 . In addition, drawing 7 is the sectional view which looked at the organic LED element 20 from the **** 16 side. First, cross-sectional form produced in part the substrate 5 made from a plastic in which the concavo-convex part 6 of the triangular prism form of a right triangle was formed in the shape of a stripe. This substrate 5 carries out injection molding of the Pori Karbo Nate resin, and is manufactured. Subsequently, the aluminum reflective film 7 was formed in the concavo-convex part 6 formed in the shape of a stripe by a thickness of 50nm - 200nm using the conventional mask vapor-depositing method (drawing 7 (a)).

0044] Subsequently, the photo-setting resins 1a, such as polyimide resin, an epoxy resin, and acrylate resin, were formed with the spin coat method on the aluminum reflective film 7, and two or more light guide sections 1 of the shape of a stripe corresponding to each aluminum reflective film 7 top were produced by irradiating ultraviolet rays through a photomask (drawing 7 (b)).

0045] Subsequently, the resin 13a for the black matrices of optical hardenability was formed with the spin coat method etc. on it, ultraviolet rays were irradiated through the photomask and the light-shielding film 13 was formed between light guide sections 1 (drawing 7 (c)). Next, the stripe-like anode 2 was formed so that the terminal 15 for anodes which formed separately the transparent electric conduction films 2a, such as ITO, on each light guide section 1 might be contacted (drawing 7 (d)).

0046] Subsequently, the negative pole 4 was formed by the mask vapor-depositing method, and the organic LED element 20 was obtained so that the formed anode 2 might be covered, and electric connection could be performed with the terminal 14 for the negative poles which formed the organic LED film 3 with the mask vapor-depositing method or the spin coat method, and was separately formed on it (drawing 7 (e)). In addition, in the process of drawing 7 (c), ultraviolet rays are irradiated by using the reflective film 7 as a mask from this substrate 5 side using the transparent substrate 5, and a light-shielding film 13 can be formed between light guide sections 1.

0047] with the form 1 of said operation carried out, and the form 2 of operation, the section in each concavo-convex part 6 should pass said reflective surface from an entrance plane by setup of the angle of these reflective surfaces, a position, etc., using a triangle portion as a reflective surface -- shortest-ization of **** which reaches the Idei side (**** 16) can be attained.

0048] the form 3 of operation -- an example of the organic LED element concerning the form 3 of implementation of this invention is shown in the sectional view of drawing 8 .

0049] As shown in drawing 8 , this order comes to laminate the light-emitting part with which the organic LED element 30 consists of an anode 2, an organic LED film 3, and the negative pole 4 on the light guide section 1 ight element) by which the cut which constitutes the concavo-convex part 26 was formed in the upper surface. The reflective surface 7a is formed in the field which is in a light guide section 1 and counters an entrance plane.

The concavo-convex part 26 is arranged so that the slope 31 which it has the section of the shape of a serrated knife by which a triangle continues in the outgoing radiation direction A of light, and one oblique side of said three square shapes each faces a reflective surface 7a may be formed.

[0050] Each triangle section portion which forms the above-mentioned concavo-convex part 26 constitutes the right-angled triangular prism form which has the side prolonged in the direction which intersects perpendicularly on the outgoing radiation direction of light. Like the form 1 of operation, this triangular prism is prepared so that the center line X of the side of a triangular prism may become parallel to **** 16. Incidence light reflects in a reflective surface 7a, and each of the slope 31 of a triangle section is arranged so that it may be emitted from **** 16 which is the Idei side. Although an anode 2 and the organic LED film 3 are formed in the concavo-convex whole part 26 at this order, respectively, the negative pole 4 is formed only in the portion of the organic LED film 3 formed in the portion of the slope 31 of the concavo-convex part 26.

[0051] The reflective film (or dispersion film) 7a can be formed in the bottom and the side of a light guide section 1. Light which leaks from the bottom and the side of a light guide section 1 outside can be lessened by this, and the part and extraction light volume from **** 16 can be enlarged.

[0052] Since the light from each slope 31 of the concavo-convex part 26 which has a serrated knife-like section enters into a reflective surface 7a and progresses in the direction of **** 16 with the form 3 of operation, shortly after the organic LED film 3 emits light Since the light volume reflected in the **** 16 direction among the light reflected on the bottom of a light guide section 1 increases, big luminescence power is obtained from **** 16. Moreover, you may make **** 16 into a curved surface or lens form. Said light does not repeat a reflection inside a light guide section. Therefore, attenuation of light is suppressed and large light volume can be obtained from **** of a light guide nature board.

[0053] the form 4 of operation -- a X-X' section [in / for an example of the organic LED element concerning the form 4 of implementation of this invention / the sectional view of drawing 9 and drawing 9] is shown in the sectional view of drawing 10 seen from the **** side.

[0054] As shown in drawing 9 and drawing 10 , two or more triangular concavo-convex part 26, light guide sections 1, anodes 2, organic LED films 3, and negative poles 4 are formed on a substrate 5 at this order, and the organic LED element 40 becomes. The point that the organic LED element 40 differs from the organic LED element 30 concerning the form 3 of operation is a point that the slot 11 is fill uped with light-sheilding resin 13 while having two or more slots 11 which were mutually parallel and extended in the outgoing radiation direction A of light, as the concavo-convex part 26 is shown in drawing 9 . The resin which has ******, such as black resin or black matrices for which light-sheilding resin 13 is used with a liquid crystal display, is mentioned.

[0055] Light-sheilding resin 13 consists of black resin for black matrices, division formation of the light guide section 1 of the shape of two or more stripe is carried out along the outgoing radiation direction A (drawing 10) on a substrate 5 with a slot 11 and light-sheilding resin 13, and the light emitting element of the shape of a stripe of one articles consists of organic LED elements 40.

[0056] The organic LED element 40 is formed in the shape of a stripe on each light guide section 1 by which division formation was carried out by the film thickness whose anode 2 which consists of transparent electric conduction films, such as ITO, is 50-400nm. Next, the transparent electric conduction film of the shape of a stripe of an anode 2 is straddled, the organic LED film 3 is formed by the film thickness which is 50-400nm, and the negative pole 4 is formed in the film thickness which is 50-400nm. As each transparent electric conduction film which forms an anode 2 is shown in drawing 9 and drawing 10 , it is formed so that the terminal 15 for anodes corresponding to each light guide section 1 may be contacted electrically, and the negative pole 4 is formed so that the terminal 14 for the negative poles may be contacted electrically. In addition, the negative pole 4 may be formed by one so that all the light guide sections 1 may be straddled, and you may form it as the two negative poles 4 disconnected mutually.

[0057] With the organic LED element 40 by the form 4 of operation, by impressing voltage between the arbitrary terminals 15 and the common terminal 14, the organic LED film 3 inserted into the anode 2 and the negative pole 4 of the selected light emitting element can be made to be able to emit light, and it can be emitted from **** 16 of a light guide section 1. A thin optical head can be offered by making the **** luminescence type organicity LED film 3 of the shape of such an array emit light. The organic LED element 40 was able to obtain the big amount of luminescence from **** 16 like the organic LED element 30 concerning the form 3 of operation compared with the conventional organic LED element.

[0058] said section [in / as carried out / at the form 3 of operation and the form 4 of operation / each concavo-convex part] should pass a reflective part from said entrance plane by setup of the angle of these entrance planes, a position, etc., using a triangle portion as an entrance plane -- shortest-ization of **** which reaches the Idei side (**** 16) can be attained.

[0059] With the organic LED element by the form 1-4 of operation, in comparison with the conventional **** luminescence type organicity LED element, when the same voltage is impressed, big luminescence power comes to be obtained. Therefore, if the **** luminescence type organicity LED array using the organic LED element by

the form 1-4 of operation is constituted, compared with the conventional array, power required in order to expose the photo conductor surface can be obtained on low voltage, and a low power consumption type array can be offered. Moreover, since a light emitting element can be driven by the low voltage, an array long lasting compared with the former and reliable can be offered.

[0060]

[Effect of the Invention] In the 1st invention, since the light which entered into the light guide section reflects in each slope of the concavo-convex part which has a serrated knife-like section and it progresses in the direction of the Idei side immediately, the number of times of said light which repeats a reflection decreases compared with the former inside a light guide section. Therefore, attenuation of light is suppressed and large light volume can be obtained from **** of a light guide nature board.

[0061] In the 2nd invention, since the light from each slope of the concavo-convex part which has a serrated knife-like section enters into a reflective surface and progresses in the direction of the Idei side immediately, the number of times of said light which repeats a reflection decreases compared with the former inside a light guide section. Therefore, attenuation of light is suppressed and large light volume can be obtained from **** of a light guide nature board.

[Translation done.]